
Zoology Syllabus

UNIT I ZOOLOGY – SOME BASICS

- A. Zoology as a branch of biology
 - i. kingdoms
 - ii. branches of biology
- B. Careers in zoology
- C. The animal cell
 - i. review organelles
 - ii. how animal cells differ from cells of other organisms
 - iii. eukaryotic vs. prokaryotic cells
 - iv. view cells in lab
 - v. crenation and lysis of an animal cell in lab
- D. Protostomes and deuterostomes
- E. Characteristics that distinguish animals
- F. Survey phylogeny of Kingdom Animalia
 - i. list major phyla
 - ii. students search internet for representatives of major phyla and their characteristics
 - iii. compare and contrast monotremes, marsupials, and placental mammals
- G. Fun with zoology and some interesting things to know
 - i. What do we call the young of various animals?
 - ii. What do we call a group of various kinds of animals?
 - iii. What is the gestation period for various common animals?

UNIT II EVOLUTION

- A. Darwin's theory of organic evolution
 - i. What is a theory?
 - ii. Evolution and the process of science
 - iii. Evidence for animal evolution
- B. Natural selection
 - i. the role of mutation
 - ii. the importance of variation in a population
 - iii. human variation lab – variation in salivary amylase
- C. Geologic time
- D. Microevolution vs. macroevolution
 - i. genetic drift
 - ii. Hardy – Weinberg

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UNIT III GENETICS

- A. Review basic genetics
 - i. dominant and recessive traits
 - ii. punnett square problems
 - iii. monohybrid, dihybrid and trihybrid crosses
 - iv. genotype vs. phenotype
- B. Genetic drift problems
 - i. how alleles become more or less common
 - ii. chi-square analysis of a monohybrid trait
- C. Review DNA and the gene code
 - i. the four DNA nitrogenous bases
 - ii. codons
 - iii. transcription and translation
- D. Speciation
 - i. prezygotic
 - ii. postzygotic
- E. Examples of how speciation occur
 - i. Sympatric speciation
 - ii. Allopatric speciation
- F. *Drosophila melanogaster* lab
 - i. a living example of a dihybrid cross
 - ii. data analysis

UNIT IV ECOLOGY

- A. Ecological relationships
 - i. animals as heterotrophic components of the ecosystem
 - ii. opportunistic vs equilibrium species
 - iii. population growth and how animals control it
 - a. Thomas Malthus and reproductive potential
 - b. Factors such as mortality, natality, emigration, immigration, and stress
- B. Microfauna and macrofauna
 - i. microhabitat study in the lab
 - ii. berlese analysis of soil organisms
- C. Entomology – a look at one group of invertebrates
 - i. insects as an evolutionary success story
 - ii. insects as a vital part of the ecosystem
 - iii. insect collection lab
- D. Ornithology – a look at one group of vertebrates
 - i. birds as interesting and vital components of the ecosystem
 - ii. bird watch lab
- E. Ethology

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UNIT V ANIMAL STRUCTURE AND FUNCTION

- A. What are anatomy and physiology?
- B. Basic inorganic chemistry – a review
 - i. acids, bases and pH
 - ii. buffers and how they work
 - iii. importance of water to living things
 - a. water as a solvent
 - b. dipolarity of the water molecule
 - c. electrolytes
- C. Basic organic chemistry
 - i. monomers, oligomers and polymers
 - ii. carbohydrates, lipids, nucleic acids and protein
 - iii. coupled reactions
 - a. reduction
 - b. oxidation
 - iv. dehydration vs. hydrolysis
 - v. primary, secondary, tertiary and quaternary structure
- D. Dialysis of various carbohydrates lab
- E. Enzymes as organic catalysts
 - i. enzymes as proteins
 - ii. ribozymes
 - iii. pH and enzyme activity lab
- F. Membranes
 - i. plasmalemma and other cell membranes
 - ii. lipid bilayer
 - iii. stress on membranes lab
- G. Comparative anatomy
 - i. skeletal anatomy
 - ii. bone lab
 - iii. circulatory anatomy
 - iv. heart dissection

UNIT VI BIO-ISSUES

- A. Research project
- B. Student presentations / discussion